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Case Report

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# Treatment of gingival recession using connective tissue and modified tunnel technique

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## ABSTRACT

The tunnel technique is an up-to-date technique that is actively used in the treatment of multiple gingival recessions. The use of a connective tissue graft in addition to the coronally displaced subperiosteal flap, which is freed without disrupting the papillary integrity, provides an increase in keratinized tissue, treatment of gingival recession and thickening of gingival tissue. The aim of this study is to evaluate the results of connective tissue graft placed with tunnel technique. A systemically healthy 26-year-old female patient with gingival recession in her lower right canine and premolar teeth underwent tunnelled connective tissue graft placement and the results of the operation were evaluated at a 2-year follow-up. As a result, the modified tunnel technique and connective tissue graft were found to be very successful in root surface closure.

**Keywords:** Connective tissue graft, modified tunnel technique, gingival recession

## INTRODUCTION

Gingival recession is defined as the apical displacement of the gingival margin that occurs as a result of different conditions and pathologies in relation to clinical attachment loss. All surfaces of the tooth may be affected by these recessions (interproximal, buccal, lingual).[1]

Gingival recession is frequently seen in adults and tends to increase with age. Gingival recession, in which one or more surfaces are affected, is observed in 88% of individuals after the age of 65, while this rate is 50% between the ages of 18 and 64.[2] Dentin sensitivity, cervical lesions such as abrasion erosion, root surface caries, aesthetic problems and difficulty in controlling dental plaque accumulation that occur with gingival recession make this situation clinically important.[3,4]

Gingival recession is classified as associated or unassociated with pathologic alveolar bone loss. Non-pathologic alveolar bone loss may occur due to various predisposing factors such as mechanical trauma, plaque-induced inflammation, thin gingival phenotype, tooth position, orthodontic tooth movement and mechanical trauma.[5] Periodontal inflammation caused by dental plaque and trauma caused by improper tooth brushing can be shown as two important reasons for the occurrence of marginal tissue recession. Along with the control of these factors, the use of appropriate, effective and accurate plaque control methods for the patient is extremely important for the prevention of gingival recession.[6]

In addition to the classification previously made by Miller regarding the treatment of gingival recession, Cairo et al.[7] made a simple classification for recession in the buccal region to predict the outcome of root surface coverage based on clinical evaluation of interproximal attachment levels.

According to this classification, recessions occurring buccally without interproximal attachment loss are called type 1, recessions with equal or less buccal attachment loss are called type 2, and recessions with more interproximal attachment loss than buccal attachment loss are called type 3.[7] New definitions regarding the treatment of gingival recession are based on the evaluation of the amount of open root surface, the status of the enamel-cementum junction and clinical attachment loss in the interproximal region.[2]

At the 2017 World Periodontology Workshop, a new classification based on the measurement of clinical attachment loss and proposed by Cairo et al.[8] was introduced by adding gingival phenotype and open root surface features to the gingival recession classification. With this classification, the potential for root surface coverage can be estimated and the success of root surface coverage in cairo type 1 recession can be predicted as 100%.[9]

Treatment of gingival recession is performed to eliminate dentin sensitivity, prevent root caries, increase the amount of keratinized tissue and for aesthetic purposes.[8] The first

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step of an effective prevention and treatment program is to identify factors associated with gingival recession and modifiable conditions. Non-surgical treatment options for gingival recession include optimal plaque control, removal of overhanging subgingival restorations and use of desensitizing agents.[10]

Surgically, various techniques such as laterally shifted flap, free gingival graft, connective tissue graft, directed tissue regeneration, acellular dermal matrix and their combinations have been developed and applied. However, coronally advanced flap and tunnelling procedures with connective tissue graft are considered the most predictable treatment options for single and multiple gingival recession defects.[8]

## CASE

A systemically healthy, non-smoking 26-year-old female patient was admitted to our clinic for the treatment of gingival recession in her lower right canine and premolar teeth. Cairo type 1 recession was detected. The patient had a defect not exceeding 2 mm in depth in the cervical region of the crown of tooth number 43 and on the coronal root surface. The patient received phase-1 treatment and oral hygiene motivation before the operation. Since the defect in tooth 43 did not exceed 2 mm, it was not necessary to restore it with composite and root planning was performed on the root surfaces of both teeth. Due to the presence of sufficient keratinized gingiva apical to the recessions and the presence of multiple gingival recessions, it was decided to apply connective tissue with the modified tunnel technique (Figure 1).

**Figure 1.** Intraoral image of the patient after phase 1 treatment

The technique used by Otto Zühr et al.[11] was preferred. An intra sulcular incision was made with a microsurgical scalpel through the gingival groove. The papillae were freed as much as possible before using the tunnel blades. The periosteum at the base of the papilla was cut with a micro scalpel and the buccal half of the papilla was completely freed with a papillary elevator. The procedure was continued with tunnel blades to avoid perforation of the tunnel, and the incision was advanced in a circular motion until the apical mucogingival margin. The borders of the tunnel were extended one tooth mesial and distal to the receding teeth. The tunnel was checked with a miller's probe to ensure adequate freedom.

A 1.5-2 mm thick connective tissue graft was obtained from the same side palate of the patient and 5.0 non-resorbable polyamide sutures were used. The needle was inserted through the liberated area of the mesial half of tooth 45 and exited the mesial sulcus of 44, and the needle was advanced through the sulcus in an inverted manner and exited the gingival margin of tooth 43, which was severely affected by extraction. The needle was passed through one end of the connective tissue first from the inside to the outside and then from the outside to the inside and the connective tissue was grasped and pulled into the tunnel with the help of a miller probe and the connective tissue was fixed by returning to the area first entered with the needle. On the other side, the free end of the connective tissue was grasped in the same way and advanced into the tunnel mesial to 43 and fixed. Suspension sutures were used to ensure that the flap overlying the connective tissue completely covered the connective tissue and the tissue was fixed (Figures 2 and 3).

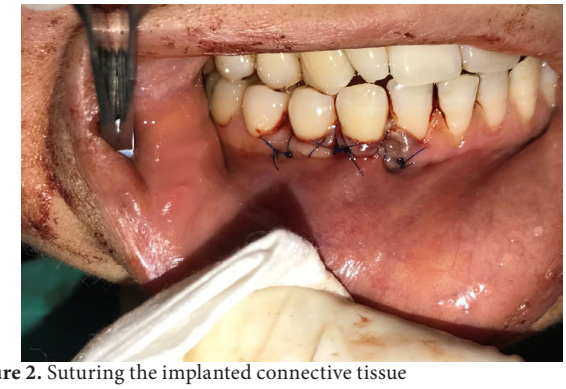

**Figure 2.** Suturing the implanted connective tissue

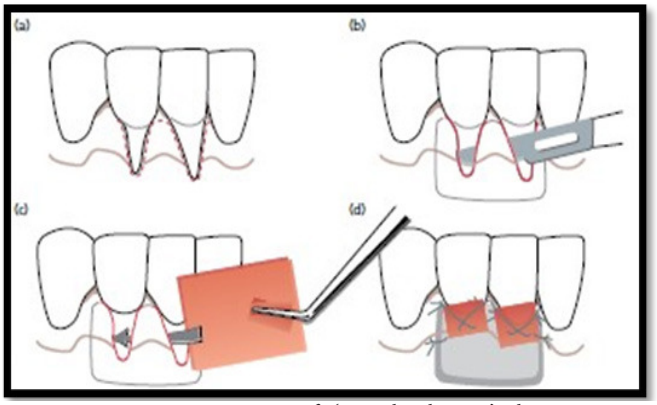


**Figure 3.** Free connective tissue graft: 'tunnel technique' schematic drawings[6]

The patient was asked not to brush the operation area for 2 weeks and to protect the area from traumatic situations. Postoperatively, the patient was prescribed analgesics, anti-inflammatory and antibiotics for 1 week (etodolac 400 mg tablet and amoxicillin/clavulanic acid 625 mg film tablet). A 0.12% chlorhexidine gluconate mouthwash was prescribed for 2 weeks. 12 days later, the sutures in the recipient and donor sites were removed (Figure 4).

**Figure 4.** Intraoral image of the patient 12 days later

No complications were observed in the early postoperative period (Figure 5).

**Figure 5.** Intraoral image of the patient 2 years later

## DISCUSSION

Due to its prevalence in the society, many techniques and materials have been used in the treatment of gingival recession to date.[12] In these treatments, it has been aimed to develop the least invasive method as well as to obtain the best clinical result. Although coronally shifted flaps and connective tissue procedures using the modified tunnel technique have been compared in different studies, there is no definite conclusion as to which approach is superior.[13] The results reported in some studies have shown that connective tissue graft is an effective tool for achieving root surface coverage.[12] Tözüm et al.[14] used free connective tissue graft in combination with the tunnel technique in their study and observed a 95% success rate in root surface coverage.

Gingival phenotype is assessed by gingival thickness and keratinized gingival width parameters and has a significant relationship with gingival recession.[15] There are reports that a higher initial gingival thickness increases success in root planing procedures. The literature suggests that gingival recession is less common after regenerative periodontal procedures where the gingiva is thicker (greater than 1 mm) and that a gingival thickness of 1.1 mm is a critical threshold for complete root coverage in mucogingival surgery.[16]

Gingival recession often presents with wedge-shaped damage in the slave area of the affected tooth. It should be decided whether restoration of this area is necessary before covering the root surface.[17] Unless it is very necessary, there should be no restoration in the apical part of the enamel-cement border, only in the area where the defect is located. As long as the defects do not exceed 2 mm, the root surface can be supported with a thick connective tissue.[17] Therefore, restoration of the defect in the cervical third of the root was not deemed necessary in our patient and it was decided to support the gingiva by increasing the thickness of the connective tissue in that area.

The use of the connective tissue technique in combination with the tunnel technique maximizes both papillary and lateral blood flow for the free connective tissue graft. The ability to feed the graft from both the inner and outer regions at the same time increases the survival rate and accelerates wound healing.[18] The half-thickness of the lifted flap and the fact that no horizontal or vertical incisions are used are among the important advantages of the technique. On the other hand, high experience and more specific instruments are needed during the tunnel procedure due to the risk of perforation of the flap in the recipient site.[11] The advantages and disadvantages of each technique in the treatment of gingival recession should be carefully evaluated and patient-specific plans should be made.

## CONCLUSION

After 2 years of follow-up, the patient was aesthetically very satisfied with the result, the keratinized gingival width increased, and gingival recession showed almost 100% closure in teeth 43 and 44.

## ETHICAL DECLARATIONS

### Informed Consent

The patient signed and free and informed consent form.

### Referee Evaluation Process

Externally peer-reviewed.

### Conflict of Interest Statement

The authors have no conflicts of interest to declare.

### Financial Disclosure

The authors declared that this study has received no financial support.

### Author Contributions

All of the authors declare that they have all participated in the design, execution, and analysis of the paper, and that they have approved the final version.

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